

Answer on Question #72949 Physics / Other

Find the angle between the two vectors $\mathbf{A} = 2\mathbf{i} + 3\mathbf{j} + \mathbf{k}$ and $\mathbf{B} = -4\mathbf{i} + 2\mathbf{j} - \mathbf{k}$.

Solution:

The scalar product of vectors

$$(\mathbf{A} \cdot \mathbf{B}) = A_x B_x + A_y B_y + A_z B_z$$

$$(\mathbf{A} \cdot \mathbf{B}) = |\mathbf{A}||\mathbf{B}| \cos \theta$$

Thus

$$\cos \theta = \frac{A_x B_x + A_y B_y + A_z B_z}{|\mathbf{A}||\mathbf{B}|}$$

$$\cos \theta = \frac{2 \times (-4) + 3 \times 2 + 1 \times (-1)}{\sqrt{2^2 + 3^2 + 1^2} \sqrt{(-4)^2 + 2^2 + (-1)^2}} = -0.175$$

$$\theta = \arccos(-0.175) = 100^\circ$$

Answer: 100°

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